

## References:

1. Somogyi A, Gugler R. Cimetidine excretion into breast milk. *Br J Clin Pharmacol.* 7:627-9, 1979.

**CIPROFLOXACIN****Trade:** Cipro, Ciloxan**Can/Aus/UK:** Ciloxan, Cipro, Ciproxin**Uses:** Fluoroquinolone antibiotic**AAP:** Approved by the American Academy of Pediatrics for use in breastfeeding mothers

Ciprofloxacin is a fluoroquinolone antibiotic primarily used for gram negative coverage and is presently the drug of choice for anthrax treatment and prophylaxis. Because it has been implicated in arthropathy in newborn animals, it is not normally used in pediatric patients, although it was recently approved by the AAP for use in breastfeeding mothers. Levels secreted into breastmilk (2.26 to 3.79 mg/L) are somewhat conflicting, and vary from the low to moderate range to levels that are higher than maternal serum up to 12 hours after a dose. In one study of 10 women who received 750 mg every 12 hours, milk levels of ciprofloxacin ranged from 3.79 mg/L at 2 hours post-dose to 0.02 mg/L at 24 hours.<sup>1</sup>

In another study of a single patient receiving one 500 mg tablet daily at bedtime, the concentrations in maternal serum, and breastmilk were 0.21 µg/mL, and 0.98 µg/mL, respectively.<sup>2</sup> Plasma levels were undetectable (< 0.03 µg/mL) in the infant. The dose to the 4 month old infant was estimated to be 0.92 mg/day or 0.15 mg/kg/day. No adverse effects were noted in this infant.

There has been one reported case of severe pseudomembranous colitis in an infant of a mother who self-medicated with ciprofloxacin for 6 days.<sup>3</sup> In a patient 17 days postpartum who received 500 mg orally, ciprofloxacin levels in milk were 3.02, 3.02, 3.02 and 1.98 mg/L 4, 8, 12 and 16 hours postdose, respectively.<sup>4</sup>

If used in lactating mothers, observe the infant closely for GI symptoms. Current studies seem to suggest that the amount of ciprofloxacin present in milk is quite low. The use of this family of antibiotics in breastfeeding mothers requires a risk-vs-benefit assessment. The use of fluoroquinolone antibiotics in adolescent children has been associated with arthropathy, or swollen joints, although these would be at higher doses than via milk, and only occurred following several weeks of normal oral doses, not breastmilk. Ciprofloxacin was recently approved by the American Academy of Pediatrics for use in breastfeeding women. Ciprofloxacin is available in several ophthalmic preparations (Ciloxan). As the absolute dose presented to the nursing mother is minimal, they would not be contraindicated in breastfeeding mothers.

**Pregnancy Risk Category:** C**Lactation Risk Category:** L4**Theoretic Infant Dose:** 0.6 mg/kg/day**Adult Concerns:** Nausea, vomiting, diarrhea, abdominal cramps, GI bleeding. Several cases of tendon rupture have been noted.**Pediatric Concerns:** Pseudomembranous colitis in one infant. Observe for diarrhea. Tooth discoloration in several infants reported.**Drug Interactions:** Decreased absorption with antacids. Quinolones cause increased levels of caffeine, warfarin, cyclosporine, theophylline. Cimetidine, probenecid, azlocillin increase ciprofloxacin levels. Increased risk of seizures when used with foscarnet.**Alternatives:** Norfloxacin, Ofloxacin**Adult Dosage:** 250 mg BID**T<sub>1/2</sub>** = 4.1 hours**PHL** = 2.5 hours**PK** = 0.5-2.3 hours**MW** = 331**Vd** = 1.4**M/P** = > 1**PB** = 40%**Oral** = 50-85%**pKa** = 7.1

## References:

1. Giamarellou H, Kolokythas E, Petrikos G, et al. Pharmacokinetics of three newer quinolones in pregnant and lactating women. *Amer. Jour. of Med.* 87:5A-49S-51S, 1989.
2. Gardner DK, Gabbe SG, Harter C. Simultaneous concentrations of ciprofloxacin in breast milk and in serum in mother and breast-fed infant. *Clin. Pharmacy* 11(4):352-354, 1992.
3. Harmon T, Burkhardt G, and Applebaum H. Perforated pseudomembranous colitis in the breast-fed infant. *J. Ped. Surg.* 27:744-6, 1992.
4. Cover DL, Mueller BA. Ciprofloxacin penetration into human breast milk: a case report. *DICP* 24:703-704, 1990.

**CISAPRIDE****Trade:** Propulsid**Can/Aus/UK:** Prepulsid, Propulsid**Uses:** Gastrointestinal tract stimulant**AAP:** Approved by the American Academy of Pediatrics for use in breastfeeding mothers

Cisapride is a gastrointestinal stimulant used to increase lower esophageal sphincter pressure, and increase the rate of gastric emptying. It is frequently used in gastroesophageal reflux.<sup>1</sup> It is often preferred over metoclopramide (Reglan) due to the lack of CNS side

TABLE 6. Maternal Medication Usually Compatible With Breastfeeding\*

Drug	Reported Sign or Symptom in Infant or Effect on Lactation	Reference No.
Acetaminophen	None	142-144
Acetazolamide	None	145
Acitretin	—	146
Acyclovir†	None	147, 148
Alcohol (ethanol)	With large amounts, drowsiness, diaphoresis, deep sleep, weakness, decrease in linear growth, abnormal weight gain; maternal ingestion of 1 g/kg daily decreases milk ejection reflex	4, 149-152
Allopurinol	—	153
Amoxicillin	None	154
Antimony	—	155
Atropine	None	156
Azapropazone (apazone)	—	157
Aztreonam	None	158
B <sub>1</sub> (thiamin)	None	159
B <sub>6</sub> (pyridoxine)	None	160-162
B <sub>12</sub>	None	163
Baclofen	None	164
Barbiturate	See Table 5	
Bendroflumethiazide	Suppresses lactation	165
Bishydroxycoumarin (dicumarol)	None	166
Bromide	Rash, weakness, absence of cry with maternal intake of 5.4 g/d	167
Butorphanol	None	168
Caffeine	Irritability, poor sleeping pattern, excreted slowly; no effect with moderate intake of caffeinated beverages (2-3 cups per day)	169-174
Captopril	None	175
Carbamazepine	None	176, 177
Carbetocin	None	178
Carbimazole	Golter	83, 179, 180
Cascara	None	181
Cefadroxil	None	184
Cefazolin	None	182
Cefotaxime	None	183
Cefoxitin	None	183
Cefprozil	—	184
Ceftazidime	None	185
Ceftriaxone	None	186
Chloral hydrate	Sleepiness	187
Chloroform	None	188
Chloroquine	None	189-191
Chlorothiazide	None	192, 193
Chlorthalidone	Excreted slowly	194
Cimetidine†	None	195, 196
Ciprofloxacin	None	197, 198
Cisapride	None	199
Cisplatin	Not found in milk	30
Clindamycin	None	200
Clogestone	None	201
Codeine	None	144, 156, 202
Colchicine	—	203-205
Contraceptive pill with estrogen/progesterone	Rare breast enlargement; decrease in milk production and protein content (not confirmed in several studies)	206-213
Cycloserine	None	214
D (vitamin)	None; follow up infant's serum calcium level if mother receives pharmacologic doses	215-217
Danthron	Increased bowel activity	218
Dapsone	None; sulfonamide detected in infant's urine	191, 219
Dexbrompheniramine maleate with <i>d</i> -isopropylamine	Crying, poor sleeping patterns, irritability	220
Diatrizoate	None	221
Digoxin	None	222, 223
Diltiazem	None	224
Dipyrrone	None	225
Disopyramide	None	226, 227
Domperidone	None	228
Dyphyllinet	None	229
Enalapril	—	230
Erythromycin†	None	231
Estradiol	Withdrawal, vaginal bleeding	232
Ethambutol	None	214
Ethanol (cf. alcohol)	—	